

FINAL MEETING SUMMARY

HANFORD ADVISORY BOARD TANK WASTE COMMITTEE

September 23, 2015

Richland, WA

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This is only a summary of issues and actions discussed at this meeting. It may not represent the fullness of represented ideas or opinions, and it should not be used as a substitute for actual public involvement or public comment on any particular topic unless specifically identified as such.

Opening

Bob Suyama, Tank Waste Committee (TWC) chair, welcomed the committee and introductions were made. Committee members adopted the May 2015 TWC meeting summary.

Announcements

Joanne Grindstaff, U.S. Department of Energy—Office of River Protection (DOE-ORP), announced that DOE-ORP recently moved the topic of Tank Farm Vapors Issue into the holding bin of the Hanford Advisory Board's (HAB or Board) fiscal year (FY) 2016 Work Plan. Joanne noted that DOE-ORP would be unable to provide informational support to HAB conversations on this subject until further notice, due to recently filed litigation relating to the topic. Joanne provided TWC members with a memorandum¹ from DOE-ORP detailing the litigation and conflict of interest considerations that informed DOE-ORP's inability to support future HAB discussion of tank vapors. Joanne noted that DOE-ORP would continue

Attachment 1: Recusal Letter Related to Tank Farm Vapors Lawsuit (DOE-ORP Memorandum)

to provide the Board with information relating to Hanford tank farms, and she was hopeful that TWC members would otherwise receive a high level of quality information to allow the Board to continue working on other work plan topics.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. DOE-ORP is limited in its ability to discuss certain topics during ongoing litigation. However, the Board should not be constrained in the same way. The HAB is made up of volunteers, and members should have the ability to express personal values and the values of their stakeholders.

R. [DOE-ORP] The HAB Work Plan highlights topics on which the Tri-Party Agreement (TPA) agencies would like the Board to provide feedback. Unfortunately, DOE-ORP is unable to provide information, briefings, and support on all topics pertaining to Hanford Site cleanup; and certain topics are further limited by outside events (e.g. ongoing litigation). The Board is managed under the Federal Advisory Committee Act (FACA), and Board activities are federally funded. Therefore, Board activities and inquiries must fall under the guidelines enumerated in FACA.

Q. Before the Board came into existence, Hanford Site cleanup was very contentious. Stakeholder relations were difficult for the U.S. Department of Energy (DOE) and other TPA agencies to manage, and these challenges contributed to the creation of the Board. Many people currently working on Hanford cleanup do not remember these complicated times. Board members are very interested in moving forward with open dialogue with TPA agencies to ensure effective Hanford Site operation and public outreach.

R. [DOE-ORP] Ongoing litigation has proven to be a challenge for DOE-ORP. Moving forward, HAB support as it relates to tank farm vapors will likely be managed by DOE-ORP in a fashion similar to the Consent Decree. It makes sense from an efficiency perspective for the Board and agencies to collaboratively work on topics that are unconstrained by legal restrictions.

Q. The tank vapor discussion is very important to continued worker health. If the Board is not going to be able to discuss this topic, the Board needs to go on record and state that it is not the choice of Board members to pause discussion on this topic.

R. [DOE-ORP] From a legal perspective, DOE-ORP is unable to discuss tank farm vapors at this time. DOE-ORP looks forward to continuing this conversation with the HAB as soon as possible.

C. It is unfortunate that disagreements on Hanford Site cleanup end up in the judicial system. TPA agencies should explore alternative strategies for dispute resolution. Large Hanford cleanup projects, such as the Waste Treatment and Immobilization Plant (WTP) and tank farm vapor management are, at their heart, research and development. Completing such projects on a schedule is very difficult.

Bob thanked DOE-ORP and committee members for their comments, and he was hopeful that the HAB could work with the agencies to begin discussion on this important topic as soon as possible.

Low-Activity Waste Pretreatment System Critical Decision – 1

Presentation

Steve Pfaff, DOE-ORP, provided TWC members with an update on the engineering, scope, and progress of the Low-Activity Waste Pretreatment System (LAWPS), paying special attention to the Critical Decision (CD) steps in LAWPS design and detailing what each step in the CD process entails.

Key points from Steve's presentation ² included:

- Performance parameters for LAWPS include supporting the WTP Low-Activity Waste (LAW) Facility, removing of solids and cesium from liquid tank waste, attaining compliance with environmental regulations, and ensuring that the system provides flexibility to accommodate future updates to LAW pretreatment.
- DOE Order 413.3B (Program and Project Management for the Acquisition of Capital Assets) highlights the process for beginning a new project like LAWPS. There are five CD steps outlined in the order:
 - Attaining CD-0 approves the statement and clarification of need
 - Attaining CD-1 approves an alternatives analysis and conceptual design
 - Attaining CD-2 approves final design
 - Attaining CD-3 authorizes construction of the final design
 - Attaining CD-4 authorizes active operation of the constructed facility
- For LAWPS, DOE-ORP obtained CD-0 (the approval of need) in March 2014 and CD-1 (the approval of alternative selection and the conceptual design) in May 2015. The project is now pursuing CD-2 and CD-3. Currently, project staff are looking into completing the facility's preliminary design and finalizing the cost and schedule baseline.
 - For LAWPS, DOE-ORP is working to combine approval for CD-2 and CD-3 and anticipating completed preliminary design in May 2017.
 - Prior to approval of CD-2 and CD-3, DOE-ORP will conduct engineering scale integrated tests at a 1:9 scale. Washington River Protection Solutions (WRPS) will be in charge of the LAWPS project but may contract these integrated engineering tests.
 - Following approval of CD-2 and CD-3, DOE-ORP plans to begin construction and procure those LAWPS components that have extended manufacturing lead times.
 - DOE-ORP will submit permit modification requests to the Washington Department of Ecology (Ecology) when the LAWPS design is at 80% complete. DOE-ORP and Ecology

Attachment 2: *Low Activity Waste Pretreatment System* (DOE-ORP presentation)

are anticipating that approximately 30 new permits and permit modifications will be needed.

- LAWPS design incorporates a cross-flow filtration system and an elutable cesium-capture medium. This design provides operations and maintenance experience that is relevant to future WTP operations. In this regard, LAWPS will serve as a precursor to WTP.
- LAWPS design will keep both melters at the future LAW Facility running at full capacity (30 metric tons of glass each day).
- A goal for the current design of LAWPS is to allow the system to potentially incorporate non-elutable cesium capture media if the storage or disposal preferences evolve in the coming years.
 - Existing plans call for the disposal of spent elutable media to be casked and stored at the Integrated Disposal Facility (IDF) as low-level waste.
 - Existing plans call for cesium captured during LAWPS operations to be returned to the double-shell tank (DST) farms
- Engineering for LAWPS is following Technology Readiness Level (TRL) guidelines described in DOE G 413.3-4A (Technology Readiness Assessment Guide). The interconnectivity between CD levels and TRL are noted in the table on p. 10 of the DOE-ORP presentation.

Regulator Perspectives

Dan McDonald, Ecology, recognized that LAWPS will need to function as a stand-alone system and also as a component of the overall WTP. This incorporation into existing and planned infrastructure means that DOE-ORP will need to incorporate functioning input and output lines into its design and permitting efforts. Ecology was hopeful that DOE-ORP would share a full design demonstrating full LAWPS interconnectivity soon, and Dan underscored the need for additional information relating to permitting.

Dan also noted that Ecology needed DOE-ORP to submit correct documentation in order for permits and permit modifications to be approved in a timely manner. Dan highlighted that the permitting process often incorporates public comment periods and other tasks that take a prescribed amount of time, and he encouraged DOE-ORP to take these comment periods into consideration while planning timelines for project design and operation.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

C. The U.S. Government Accountability Office (GAO) has noted that DOE appeared to make major engineering decisions prior to the CD-0 in the design of LAWPS.

R. [DOE-ORP] The GAO noted in a recent report that DOE-ORP appeared to have made final project decisions before the approval of CD-0. That is the opinion of the GAO reviewers. DOE-

ORP is very interested in getting the WTP operational as soon as possible and beginning the vitrification of tank wastes. Beginning treatment of tank wastes with LAWPS is a way for DOE-ORP to begin the mission soon.

Q. What are the long lead-time components for LAWPS? Are these components all specialized, one-of-a-kind items? What happens if the design of the facility changes while manufacturers fabricate these components?

R. [DOE-ORP] The ion-exchange vessel that holds the cesium-capture resin is an example of an extended lead-time item. The integrated 1:9 test will help to inform the overall design, and full-scale testing of some highly specialized pieces (like the ion-exchange vessel) will ensure a design that is consistent with the needs of the entire system. Early design and fabrication helps to mitigate construction delays.

Q. There was an earlier version of LAWPS in 2011. Does the earlier work inform the current process?

R. [DOE-ORP] The LAWPS project has had several additional iterations beyond 2011. In 2008, it was called early LAW. Reviewers for LAWPS have critically examined design information from earlier efforts.

Q. Why were earlier LAW treatment efforts cancelled?

R. [DOE-ORP] Funding from earlier LAW treatment efforts was moved towards other priorities, and the system was never fully designed. DOE-ORP allocated \$23 million in funding for the project from the WTP and \$5 million from tank farm budgets in FY2015 and \$75 million was requested in FY2016. The need that is driving the project forward at this moment is the treatment of tank waste in preparation for WTP operation.

Q. Will new buildings be constructed for full-scale testing?

R. [DOE-ORP] No. DOE-ORP will contract testing to entities that have existing access to facilities.

Q. Will components used in full-scale testing then be incorporated into the final design?

R. [DOE-ORP] That is DOE-ORP's intent. The full-scale testing will be done with the final components, and they will be used in the final facility design whenever possible.

C. DOE-ORP needs to present the design for the LAWPS system to regulators and the public as early in the process as possible in order to solicit feedback. DOE-ORP should ensure that public presentations follow plans for the LAWPS system from facility construction to demolition, and the agency must work to remain open to feedback throughout the design process.

C. The LAWPS facility design needs to incorporate the latest seismic risk information.

C. The technical readiness process that DOE-ORP is following in construction of the LAWPS system originally came from work done by the U.S. military and the National Aeronautics and Space

Administration (NASA). The conceptual design of the process does not incorporate “exit ramps;” DOE-ORP needs to critically assess the technology at every step and ensure that the engineered design best meets the need.

Q. How much funding has DOE-ORP received for LAWPS?

R. [DOE-ORP] The \$75 million provided to LAWPS pre-design in FY2016 was a one-time allocation following DOE’s decision on a path forward for treatment of LAW. \$4.5 million from tank farm funds was used in FY2014 to do conceptual design. In FY2015, \$5 million in tank farm funds continued conceptual design work until May 2015 when CD-1 was approved. After CD-1 approval, ORP began using the \$23 million capital project funding to commence preliminary design.

Q. What does elutable mean in reference to the media (resin) that DOE-ORP plans to use in the LAWPS system?

R. [DOE-ORP] Elutable resin can be reused. DOE-ORP’s current plans for cesium removal calls for the use of an elutable resin. This resin can capture cesium, and the cesium will be stripped from the resin using nitric acid. In contrast, a non-elutable resin permanently captures cesium.

Q. How will the design of LAWPS include contingency plans for alternative cesium management strategies?

R. [DOE-ORP] The switch from elutable to non-elutable media is not an easy design change to make; however, DOE-ORP wants to make sure that the piping for the change is already in-place if it is needed. If DOE-ORP incorporates an engineering change and uses non-elutable media, LAWPS likely needs to incorporate another special purpose, shielded module that is equipped with remote-handling capabilities.

Q. If DOE-ORP plans to elute the cesium-capture resin with nitric acid on a weekly basis, what will happen to the additional waste? Will it move to the 242-A Evaporator for volume reduction?

R. [DOE-ORP] Current plans call for cesium to be stripped from ion-exchange resin with nitric acid once per week. The acid will then be neutralized to make it compatible with tank waste chemistry. Each year, several hundred thousand gallons of liquid will be returned to DSTs, and the evaporator will help to keep this volume to a manageable level. The WTP will include an Effluent Management Facility, but currently the waste streams will rely on evaporation to keep volumes low.

R. [Ecology] The WTP Effluent Management Facility is designed to do what DOE-ORP noted, but the amount of waste that will be returned to the DSTs following WTP operations is still unclear.

Q. Can DOE-ORP provide any additional insight into disposal of cesium from LAW? Are agencies considering other sites aside from IDF for storage or disposal? Is IDF intended to be a permanent disposal site?

R. [DOE-ORP] The IDF contains a large burial trench behind the Plutonium-Uranium Extraction (PUREX) Facility that is currently empty. The IDF trench can accept low-activity waste glass and solid waste forms coming from WTP operations. Current conceptualizations call for spent, elutable ion-exchange columns to be permanently disposed of at IDF.

C. Many Board members would like to see cesium taken out of the waste and not returned to DSTs. It is important that DOE-ORP continue to consider alternative strategies moving forward; DOE-ORP should consult Ecology on an ongoing basis to ensure that any permitting or waste management challenges are caught and mitigated early in the design process.

C. Many of the ion-exchange resins carry a manufacturer's disclaimer noting that they should not be flushed with nitric acid during operations. Nitric acid is very effective at nitrating organics, and nitrated organic compounds are explosive. DOE-ORP should avoid this strategy if possible.

Q. Are there any issues with existing infrastructure or legacy contamination on the site where DOE-ORP will construct the LAWPS Facility?

R. [DOE-ORP] There are some nearby pipe-in-pipe transfer lines underground and a nearby disposal site that new lines will need to run through. Past excavations of the disposal site did not reveal any radiologic hazards. The LAWPS site itself provided DOE-ORP with the best combination of unimproved lands, no past use, and few underground interferences.

Q. How many physical shut-offs will be engineered into the transfer lines that connect LAWPS with the tank farms?

R. [DOE-ORP] The lines will be continuous from the AP Tank Farm to LAWPS and then continuous again from LAWPS to LAW. Diversion boxes in transfer lines present additional potential for leaks, so they have been limited.

Bob thanked Steve for his presentation and his responses. The committee requested additional follow-up on the LAWPS Facility as it becomes available.

A and AX Farms Retrieval

Chris Kemp, DOE-ORP, provided TWC members with an update on infrastructure installations and retrieval preparations for the A and AX Tank Farms. Chris noted that A/AX Tank retrievals are driven by both Consent Decree and TPA milestones.

Key points from Chris' presentation³ included:

- There is currently double-shell tank (DST) space for the ten A/AX tanks targeted for retrieval. AX tanks are scheduled to be retrieved first, and the receiver tank for AX Tank Farm retrievals will be AZ-102. The receiver tank for A Tank Farm retrievals will be AP-106.

Attachment 3: Tank Farms A and AX Retrieval Overview (DOE-ORP presentation)

- Tank designs between the A/AX Farms are different. A tanks are flat-bottomed with straight walls and butt welds. These welds were found to be susceptible to failure when thermally hot tank waste was placed into them. Because of this design, several A Farm tanks are assumed leakers.
- DOE-ORP and WRPS will apply lessons learned during C Farm retrieval to A/AX Farms. C Farm began as a type of demonstration farm, and retrieval infrastructure became crowded because individual retrieval systems were constructed for each individual tank. In A/AX Farms, DOE-ORP has the opportunity to use common valve boxes and common diversion boxes. There will be adequate exhaust capabilities on each tank in A/AX Farms before any retrieval efforts begin.
- There are several differences between tank wastes within A/AX tanks versus tank waste in C Farm tanks. A/AX tanks:
 - Contain waste that is primarily in the form of a saltcake, which will need sluiced with fresh water and dissolved.
 - Have built-in air lift circulator columns that will provide obstacles to sluicing.
 - Are significantly further away from receiver tanks.
 - Contain significantly more curies and a higher heat-load in less waste volume.
- DOE-ORP and WRPS assume that A-104 and A-105 are leaking, and waste stored within these tanks will be challenging to retrieve. A-105 has a buckled floor from a steam explosion in 1965. This will add additional challenge to waste retrieval in this tank, particularly.
- To dissolve saltcakes within tanks, DOE-ORP has developed an extended-reach sluicer system. This tool is very large, and it has the ability to discharge water at 100 gallons per minute and 100 pounds-per-square inch.

Regulator Perspective

Jeff Lyons, Ecology, noted that waste retrieval from A/AX tanks will begin in 2017 and run for several years. Jeff highlighted six areas of concern that Ecology is currently working with DOE-ORP to address. Jeff noted that these issues include:

- The waste in A/AX Farms has not been characterized to the needed level.
- A pre-retrieval risk assessment is not yet planned. Ecology believes that this risk assessment would allow for better retrieval decision-making. As A/AX tanks contain significantly more radiation than C Farm tanks, this risk assessment is important to effective, safe retrieval.
- A third type of retrieval technology will likely be needed for several of the more difficult tanks. Enhanced characterization and a risk assessment will provide additional detail to the question of needed retrieval technologies.

- The available DST space is not sufficient for all A/AX Tank Farms waste. Ecology does not share the same level of confidence in DOE-ORP's modelling exercises, and Ecology fears that additional water volume will be required to sluice saltcakes within tanks.
- LAWPS operations at AP-105 and AP-107 may interfere with retrieval operations at AP-106.
- Consent Decree-dictated retrievals and TPA-dictated retrievals might not fully correlate with one another. As all tanks will eventually fall under guidelines stipulated in the TPA, it is important that DOE-ORP move forward with these ultimate goals in mind to ensure efficiency.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. Do A/AX tanks sit on a refractory pad?

R. [DOE-ORP] No, there is no refractory below the concrete in the A/AX Farms. In DST farms, there is a refractory that assists in heat transfer.

Q. When were the A Farm tanks built?

R. [DOE-ORP] A Farm was constructed between 1954 and 1955.

Q. What problems has DOE-ORP encountered with the sluicing tool technology?

R. [DOE-ORP] The primary problem that DOE-ORP has encountered so far using the sluicing tool is hydraulic leaks.

Q. How will the sluicing tool be inserted into the tanks?

R. [DOE-ORP] The sluicer will be inserted into tanks via a 12-inch riser at the top of each tank.

Q. The 242-A Evaporator is relied upon heavily for both A/AX waste retrieval and LAWPS. Is this facility the single point at the Hanford Site for the volume reduction of liquid waste?

R. [DOE-ORP] Yes. This is currently the only evaporator facility at the Hanford Site with the needed capabilities.

Q. What is the history of A-105?

R. [DOE-ORP] A-105 was overfilled with very hot waste, and waste got between the tank's steel liner and concrete. In 1965 there was a steam explosion that buckled the bottom of the tank.

C. The tank was a self-boiler (it became overheated without active cooling measures), and the water below the tank would flash to steam if the tank was left alone for too long. Operators unintentionally allowed the tank to overheat in early 1965, and the concrete beneath the tank exploded, ripping a gash in the steel liner and releasing tank waste.

Q. The buckled bottom of Tank A-105 has resulted in an open gash at the bottom of the tank. How does DOE-ORP plan to retrieve waste that has migrated into this open area between the steel and the concrete?

R. [DOE-ORP] Retrieval strategies will involve a vacuum system with full track sweeper (akin to tools used for street sweeping) to push the waste to the pump. The actual technology used may change depending on findings during retrieval.

C. Analysis of leak detection wells have demonstrated that AX-102 and AX-104 are leaking. There may be more leaks that have occurred, and no definitive reason for the leaks has yet been identified. Inspectors believe that the concrete below the tanks is fully intact; however, to prevent possible release to the environment, a crawler should be sent down into the leak detection pits to further assess the situation. This would help to inform tank retrieval.

Q. What is the consistency of the saltcake within tanks? Are the noted volumes for tank retrieval the volume of the saltcake itself or the volume of the saltcake dissolved in water?

R. [DOE-ORP] The saltcake is roughly the consistency of salt licks that can be purchased for livestock. DOE-ORP estimates that dissolving each gallon volume of the saltcake takes approximately two to four gallons of water.

The committee thanked Chris and Jeff for their time. Bob encouraged Chris to return to the committee when there was further information or updates to share as A/AX Farms retrieval plans continue to evolve.

Waste Treatment and Immobilization Plant Progress and Communication Approach (joint w/ PIC)

Liz Mattson provided meeting attendees with a background on the WTP communication approach document, a collaborative effort between TWC and Public Involvement and Communication Committee (PIC) members. Liz reminded committee members that the overall goal of the Board's WTP communication approach is to describe communication techniques and strategies regarding the HLW Authorization to Proceed and the LAWPS project. Through committee discussion, issue managers hoped to further clarify potential approaches and techniques for reaching a variety of audiences.

Committee Questions and Responses^{4 5}

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. [Ecology] Is the purpose of this communication approach to help people, both technical and non-technical, understand current activities related to the WTP or is the purpose to convince people that the current strategies that DOE-ORP is working to implement are the correct ones?

R. TWC and PIC members are currently viewing the approach document as a mixture of the two concepts. The Board is under the impression that there are still many open issues that DOE-ORP and Ecology are discussing; the communication approach will serve as a baseline document for informational stakeholder outreach.

Q. [Ecology] What will DOE-ORP do with the Board's communication approach?

R. DOE-ORP requested that the Board create a WTP communication approach, such as a white paper. Once the approach is finalized, DOE-ORP WTP Assistant Manager will consider the suggestions for future outreach efforts.

Q. Should the WTP communication approach include discussion of DOE-ORP's One-System topic?

R. Yes. One-System is a key idea to convey in this document. One-System demonstrates that DOE-ORP is working to make all of the waste treatment efforts work together in harmony and that the agency is thinking through the interconnectivity of the various components.

C. There is uncertainty around the path forward for WTP. The strategies that DOE-ORP is currently moving forward with will likely evolve as work continues and DOE-ORP further coordinates with Ecology. This uncertainty will be a challenge to convey, and the approach document will need to consider strategies for working through these uncertainties.

R. One strategy that the Board can incorporate involves clearly recognizing the level of inherent uncertainty that exists in these types of complex projects. Recognizing uncertainty is an important strategy that TPA agencies do not incorporate into Hanford outreach materials to the level and extent that it should be.

C. The litigation between Washington and DOE is an ongoing issue with communicating progress at WTP. Collaboration is suffering because of the agencies' inability to coordinate on the local level.

Attachment 4: Past DOE-ORP Waste Treatment and Immobilization Plant Presentations to the Tank Waste Committee (Waste Treatment and Immobilization Plant Operability, 10/8/2014; Low-Activity Waste Pretreatment System, 11/13/2014; One System: Managing the Office of River Protection Mission and Delivering Direct-Feed Low Activity Waste, 3/11/2015)

Attachment 5: Transcribed flipchart notes

C. The communication approach needs to also look into the process that is being used to develop, engineer, and construct the WTP. The public needs to have faith in the final product and in the strategies used to arrive at the final product.

C. It will be difficult for Board members to go to stakeholder groups and share complex information about regulatory processes. Most members of the public are interested in how Hanford Site cleanup tangibly affects their day-to-day lives. Part of the Board's challenge in creating this approach document is boiling down complex procedures into relevant and understandable messages.

C. The communication approach needs to clearly highlight how interested individuals can become involved and engaged with Hanford Site cleanup.

Q. How will the communication approach fit into DOE-ORP's existing outreach plans and strategies?

R. [DOE-ORP] At this point, the communication approach will be most helpful to DOE-ORP if it focuses mostly on topic, audience, and strategy. Content is important as well, but the content will be strongly influenced by the what, who, and how.

C. Hanford cleanup will be ongoing for a very long time. It is important to involve younger members of the public. One strategy that could be used to get students interested in the WTP and in Hanford Site cleanup overall may involve describing the types of work being done and the career skills that this cleanup necessitates.

R. If available, internships and service learning opportunities could serve as strong ways to reach out to and educate younger members of the public.

R. Along the same lines, it is important that future generations have an understanding of the challenges that they are inheriting as Hanford cleanup passes to them.

C. Hanford Site workers also represent a tremendous opportunity for "in-reach." Often, workers are very familiar with only a small facet of cleanup efforts. The U.S. Department of Energy—Richland Operations (DOE-RL) and DOE-ORP could do a better job informing workers about the bigger picture.

C. An important need of the WTP approach involves creating an opportunity to enhance understanding, not just communicating ideas. Often times this involves retooling technical information and creatively presenting it in a way that is interesting and approachable.

C. A strategy that agencies could explore more may be graphic representations of complex, technical issues. These often allow for enhanced understanding, and the use of travelling graphic displays can reach a wide variety of people.

C. The final communication approach document will need approval by the full Board. This will be challenging to do, and issue managers should author the communication approach with this idea in mind. However, the document will carry more weight after it achieves Board consensus.

Committee members noted that a strategy for engaging technical audiences would need to incorporate out-of-the box thinking that could excite interested groups. Committee members also recorded the following strategies for communicating with general audiences:

- Travelling displays
- Tabling, direct outreach (going where people are)
- Youth engagement (school curriculum)
- Occupational/job training forums
- Routine follow-up, building relationships
- Internships, WSU
- Service learning, high schools
- “Inreach” with Hanford workers
- Ongoing info, building understanding

Liz and Bob thanked committee members and agency representatives for their thoughtful contributions to the ongoing conversation. Issue managers for the topic noted that a next step in the process of creating the approach document would involve grouping ideas offered by TWC and PIC members. Once these ideas were “binned,” committee members could identify areas for further development and discussion. Joanne offered to explore the potential of a future committee briefing on the treatment of high-level waste (HLW) to enhance the Board’s ability to construct an effective WTP communication approach.

Update on Cesium Management Resulting from Low-Activity Waste Pretreatment System

David Bernhard provided TWC members with an update on the topic of cesium management as it relates to the LAWPS system. David noted that topic issue managers have been working with DOE-ORP to research potential alternative options for managing, storing, and disposing cesium removed from the LAWPS stream. David highlighted updates⁶ for committee members:

- There are several potential reasons for not returning cesium (primarily in the form of cesium-137) to the tanks following removal from the LAWPS waste stream. Cesium in tanks:
 - Provides the principle radiation hazard to the Hanford Site workforce
 - Contributes to approximately 50% of the hydrogen generated in waste

Attachment 6: Cesium Management for the Low Activity Waste Pretreatment System (presentation by David Bernhard)

- Places heat stress on aging tank infrastructure
- Is costly to store in the long-term and limits DST space
- Issue managers have identified three potential alternatives to returning cesium to tanks during the LAWPS process. These include:
 - Alternative 1: Using a non-elutable resin to capture cesium, then shipping the cesium-laden resin to a deep-geological repository as HLW.
 - Alternative 2: Using a low-loading zeolite exchange media to capture cesium and shipping the waste to Waste Control Specialists (WCS) in Texas for disposal.
 - Alternative 3: Using a low-loading zeolite exchange media to capture the cesium and disposing the waste at IDF.
- An initial assessment of costs associated with each of the three noted alternatives demonstrated that Alternative 1 was the most expensive option and Alternative 3 was the least expensive option.
- Other options for cesium management may include a modified Kurion system and a portable Geo Melter, an electro-active ion exchange, or storage in a designated/constructed DST.
- Issue managers and DOE-ORP need to carefully consider regulator pathways and permit modifications for all cesium management options, and issue managers need to explore regulation and permit needs further.
- The possibility of deep borehole deposition of cesium waste is currently not an option. However, DOE is looking into this potential in the coming years. Logistic and regulatory considerations should be kept in mind moving forward to see if this pathway is a realistic option.

Committee Questions and Responses ⁵

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. If cesium is eluted from the ion-exchange media, how much waste will be returned to tanks?

R. Roughly one-third of the treated volume will be returned. Therefore, for every three gallons of tank waste removed, one gallon will be returned.

Q. Is there a DOE preference for elutable media versus non-elutable media?

R. [DOE-ORP] Dr. Monica Regalbuto, Assistant Secretary for Environmental Management, has noted that she does not wish for removed cesium to be returned to tanks. Therefore, DOE-ORP is gathering information on alternative management and disposal strategies. However, the current

Attachment 5: Transcribed Flipchart notes

plans to incorporate an elutable media are the best strategy for setting up the LAWPS system for operation within DOE-ORP's desired timeframe.

C. The cost of using a non-elutable media and disposing of canisters is far more expensive than the currently planned strategy. However, DOE-ORP needs to be sure that costs take into account all future management of cesium that is returned to tanks.

C. If DOE-ORP would use a non-elutable media to capture cesium, spent storage containers can become very hot. Dry-cask storage makes sense while containers are being stored for permanent disposal, but all options will need to be considered.

C. [DOE-ORP] DOE-ORP would like the HAB to produce a white paper on this subject that notes alternative strategies for cesium management, as well as the regulatory needs and the implications that are associated with each of the identified alternatives. There is not a safety issue associated with returning cesium to tanks, the process just lacks efficiency. DOE-ORP is authoring a white paper for Dr. Monica Regalbuto, and the HAB's input will help to inform this work.

C. Are issue managers ready to begin constructing a white paper using these noted alternatives?

R. Yes. However, issue managers still need additional information pertaining to deep borehole deposition.

Q. What is the volume of cesium coming from LAWPS in comparison to the cesium that is currently stored in capsules at the Waste Encapsulation and Storage Facility (WESF)?

R. [DOE-ORP] By volume, non-elutable canisters would take up significantly more space than the capsules at WESF. There are an estimated 1,936 capsules in WESF, and 1,335 of these contain cesium. For tank farm cesium it would be approximately 5,000 gallons of ion exchange media loaded with cesium per year, times 10 years of operation would equal 50,000 gallons, as an example.

C. Capturing cesium in a non-elutable resin and then shipping the ion-exchange vessels to WCS in Texas is a very good idea. WCS is ready and permitted to accept this waste, and the plan would move waste off-site.

Issue managers thanked DOE-ORP for the input. Committee members identified that next steps for producing the HAB white paper would involve continued conversations between topic issue managers and Steve Pfaff. Issue managers also noted that they would discuss potential regulatory options with Ecology to determine which strategies for cesium management would be preferable and realistic from a permitting perspective.

Safety Culture (joint w/ HSEP)

Dirk Dunning provided TWC members with a history and overview of safety culture, relating the concept to the ideas of Safety by Design, Safety Ethics, and the Science of Safety. Dirk provided two documents ⁷ and a presentation from U.S. Department of Energy Office of Environmental Management Senior Advisor Julie Goeckner⁸ to assist in framing the committee's discussion. The briefing that Dirk provided committee members with included the following information:

- A history of "Safety Culture," including the concept's origins in the Chernobyl Reactor Disaster. Following the incident at Chernobyl, a team of experts gathered to assess the cause of the incident. Their findings informed the International Nuclear Safety Group (INSAG), which worked to define strategies and measures that would prevent like disasters from occurring in the future.
- INSAG found that Chernobyl and other disasters happen, in large part, because of failures relating to safety and overall culture surrounding safe operations. The findings led to the first definition of safety culture (Safety Culture Discussion Framing, p. 2).
- The idea of safety culture has evolved, but it retains the same character today that it did in the years following Chernobyl. DOE incorporates the ideas of safety culture through the Integrated Safety Management Policy.
- Many times, large-scale nuclear and engineering disasters arise because of a focus on cost-reduction and efficiency at the expense of safe design.

Dirk encouraged committee members to consider this history of safety culture, and discuss whether work at the Hanford Site was moving forward with the correctly framed concepts of "safety" in mind. Dirk noted that the HAB could potentially aid DOE-RL and DOE-ORP by providing them with updates to safety culture definitions and begin a conversation with the agency and Hanford Site workers with the aim of further embedding safety into the philosophy of Hanford cleanup.

Committee Questions and Responses ⁵

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. What can the Board do to provide helpful input to TPA agencies regarding the topic of safety?

R. [DOE-ORP] The provided documents framing the discussion and outlining safety by design are interesting tools for continuing a dialogue on safe cleanup at Hanford. Framing the product as proposed in the discussion outline would be useful. The Board could package this as either a white paper or as advice. DOE-ORP views safety as a journey, not a destination. There is an

Attachment 7: Safety Culture discussion framing handouts (Dirk Dunning)

Attachment 8: Safety Culture (DOE-EM presentation)

Attachment 5: Transcribed Flipchart notes

Organizational and Safety Culture Improvement Council that meets quarterly. The HAB could provide advice to this group, put the task to the Council, then have the Council come back to the Board and provide feedback.

Q. One major component of Safety Culture is the idea of rewards and consequences. Workers at Hanford may make mistakes, but they do not feel comfortable admitting mistakes because they feel that they will be punished. This is a drain on resources, as human errors are sometimes mistakenly attributed to equipment errors. This often results in work stoppage.

R. A very heavy-handed safety culture may have the opposite effect that it is intended to have if workers are not willing to admit human error.

R. [DOE-ORP] DOE-ORP would like for the Board to continue discussing safety culture. If workers on-site do not feel comfortable admitting human error for fear of retribution or retaliation that demonstrates that there is still additional work to be done on this subject.

C. The Health, Safety, and Environmental Protection Committee (HSEP) has worked with the topic of safety culture several times in the past FY. Committee conversations were often based on existing safety culture and employee concerns at DOE and WRPS. Moving forward, HSEP could continue to track the human side of safe Hanford Cleanup, while TWC could begin looking into designing safety into cleanup strategies.

TWC and HSEP members thanked Dirk for his contributions to the day's discussions. Committee members committed to considering the topic further over the coming months. Future TWC discussions on safety culture could work to clarify the scope, intent, and purpose of Board input on the topic. Dirk noted that the committee's next discussion on Safety Culture/Safe by Design should focus on next steps. TWC planned to incorporate this discussion into the group's next in-person meeting.

Committee Business

TWC 3-Month Work Plan^{1 2}

TWC planned to meet for a Hanford Site tour in October 2015 that would tentatively include stops at the A and AX Tank Farms, C Farm, and the WTP. In either November or December 2015 (depending on agency availability), TWC will tentatively meet to:

- Receive an update on the statue of DST AY-102
- Receive a briefing on and discuss the High Level Waste Facility
- Receive an issue manager update on cesium management

Attachment 5: Transcribed Flipchart notes

Attachment 9: TWC 3-Month Work Plan

- Receive an issue manager update on the WTP communication approach
- Discuss potential committee follow up to the safety culture topic

Attachments

Attachment 1: Recusal Letter Related to Tank Farm Vapors Lawsuit (DOE-ORP Memorandum)

Attachment 2: *Low-Activity Waste Pretreatment System* (DOE-ORP presentation)

Attachment 3: *Tank Farms A and AX Retrieval Overview* (DOE-ORP presentation)

Attachment 4: Past DOE-ORP Waste Treatment and Immobilization Plant Presentations to the Tank Waste Committee (Waste Treatment and Immobilization Plant Operability, 10/8/2014; Low-Activity Waste Pretreatment System, 11/13/2014; One System: Managing the Office of River Protection Mission and Delivering Direct-Feed Low Activity Waste, 3/11/2015)

Attachment 5: Transcribed flipchart notes

Attachment 6: Cesium Management for the Low-Activity Waste Pretreatment System (presentation by David Bernhard)

Attachment 7: Safety Culture discussion framing handouts (Dirk Dunning)

Attachment 8: Safety Culture (DOE-EM presentation)

Attachment 9: TWC 3-Month Work Plan

Attendees

Board members and alternates:

David Bernhard	Pam Larsen	Mecal Seppalainen
Shelley Cimon	Susan Leckband	Rod Skeen
Shannon Cram	Liz Mattson	Richard Smith
Dirk Dunning	Melanie Meyers	Bob Suyama
Becky Holland	Ken Niles	Margery Swint
John Howieson	Ed Revell	

Others:

Joanne Grindstaff, DOE-ORP	Jim Alzheimer, Ecology	Alex Nazarali, CTUIR
Chris Kemp, DOE-ORP	Steve Lowe, Ecology	Ryan Orth, EnviroIssues
Daniel Kovis, DOE-ORP	Jeff Lyon, Ecology	Brett Watson, EnviroIssues
James Lynch, DOE-ORP	Dan McDonald, Ecology	Rob Piippo, MSA-TPA
Steve Pfaff, DOE-ORP	Ginger Wireman, Ecology	Sharon Braswell, North Wind/DOE-ORP
Kris Skopeck, DOR-RL	Tom Rodgers, WDOH	Richard Marshall, North Wind/DOE-ORP
		Kelsey Shonk, SN3
		Chris Burke, WRPS
		Doug Deford, WRPS
		Susan Eberlein, WRPS
		Dan Parker, WRPS
		Paul Rutland, WRPS
		Rob Roxburgh, WRPS
		Becky Wiegman, WRPS
		Pedro de la Torre III, student